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NIXON PEABODY, LLP
401 9TH STREET, NW
SUITE 900
WASHINGTON, DC 20004-2128

EXAMINER

YAMNITZKY, MARIE ROSE

ART UNIT	PAPER NUMBER
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1774

DATE MAILED: 10/19/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/743,337

Applicant(s)

TAKASU ET AL.

Examiner

Marie R. Yamnitzky

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 August 2005.
2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 1-21 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date rec'd 23 Dec 2003, 27 Jul 2004 and 14 Sep 2004
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____

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1. This Office action is in response to applicant's amendment and election of species filed August 08, 2005. Applicant amends claims 1-4 and 6-13, and adds claims 15-21.

Claims 1-21 are pending.

Applicant's elect, without traverse, the species in which A is (a-1) and each of B and B' is (b-1). Claims 1-21 read on the elected species.

2. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

3. The abstract of the disclosure is objected to because it is not in the form of a single paragraph and it is too long. Correction is required. See MPEP § 608.01(b).

4. Claim 21 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

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The definition of A as set forth in new claim 21 is not found in the application as originally filed. This language encompasses possibilities for A other than (a-1) through (a-20) and therefore encompasses polymers outside the scope of the original disclosure.

5. Claims 1-21 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The independent claims allow R variables to be an organic substituent “that may include an oxygen atom, a sulfur atom or a nitrogen atom”. It is not clear if oxygen, sulfur and nitrogen are the only heteroatoms that may be included in the organic substituent.

Claim 3: There is no antecedent basis for “[t]he light-emitting device” or “the layer” as dependent from claim 1, which is drawn to a polymer.

Claims 7, 10, 16, 17 and 19: It is not clear if these claims require at least two layers having different polymers, or if the “is different” limitation recited in claims 7 and 10 may be met by differences in characteristics other than the composition of the polymer, such as layer thickness.

Claims 9, 10, 12-14, 17 and 19: The structure of the device according to these claims is not clear. Independent claim 9 first recites “a layer including a polymer...formed on the plurality of first electrodes” and then recites “the plurality of layers including the polymer”. Dependent claim 10 refers to “the plurality of layers including the polymer” whereas dependent

claims 12 and 17 refer to “the layer including the polymer”. Formation of a layer including a polymer on a plurality of electrodes does not necessarily require formation of a plurality of layers including a polymer since a single, continuous layer of polymer could be deposited over an array of electrodes. It is not clear if the device of these claims actually requires more than one layer of polymer. If a plurality of layers including the polymer are required, then it is not clear if “the layer including the polymer” as recited in claims 12 and 17 refers to at least one layer including the polymer, or to each layer including the polymer.

Claims 13, 14, 19 and 20: The recitation in claims 13, 19 and 20 that “the plurality of first electrodes are respectively the nonlinear elements” is confusing. The use of the term “respectively” is confusing. It is not clear if this means that each of the first electrodes functions as a nonlinear element. The claim limitations are further unclear in light of claim 14, which depends from claim 13 and requires a thin film transistor to be used as the nonlinear elements. It is not clear in the case of claim 14 if each of the first electrodes must be part of a thin film transistor.

Claim 21: The scope of A as defined in claim 21 is not clear. It is not clear what constitutes a “hydrocarbon moiety”. It is not clear if the claim language excludes groups such as (a-14) through (a-19), which are divalent heteroaromatic groups, or if the fact that these groups include at least one CH within the ring structure(s) places them within the scope of a moiety comprising a hydrocarbon moiety.

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6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. Claims 1-3, 15 and 21 are rejected under 35 U.S.C. 102(b) as being anticipated by Tada et al. in *J. Phys. D: Appl. Phys.*, Vol. 30, pp. 2063-2068 (1997), or Sarker et al. in *Synthetic Metals*, Vol. 113, pp. 151-154 (2000) or Pei et al. in *Macromolecules*, Vol. 33, pp. 2462-2471 (2000).

Tada et al. disclose a polymer having a repeating unit of general formula (I) as defined in present claims 1, 2 and 21. For example, see Figure 1 on page 2064. Tada et al. disclose an electroluminescent (EL) device comprising a layer of the polymer between a pair of electrodes. For example, see the full paragraph in the second column on p. 2064.

Sarker et al. disclose polymers having a repeating unit of general formula (I) as defined in present claims 1, 2 and 21. For example, see poly-1, poly-2, poly-3 and poly-4 in Fig 2 on page 152. Sarker et al. disclose light emitting devices comprising a layer of one of these polymers between a pair of electrodes. For example, see the two full paragraphs in the first column on p. 152, and see Fig. 3 on p. 152. Sarker et al. also teach that combinations of different polymers may be used to make a light emitting device.

Pei et al. disclose polymers having a repeating unit of general formula (I) as defined in present claims 1, 2 and 21. For example, see 3a-f in Scheme 1 on page 2465. Pei et al. disclose light-emitting diodes comprising a layer of one of these polymers between a pair of electrodes. For example, see the section titled "Light-Emitting Diodes from the Polymers", which begins on p. 2469.

The present claims are not limited to polymers consisting of the repeating unit of general formula (1). With respect to the definition of m and n, the examiner notes that the prior art polymers meet the claim limitations regardless of whether m and n are 1 or 2. Repeating units wherein m and n are 1 or 2 are within the prior art polymer chains.

With respect to present claims 3 and 15, product by process claims are not limited to the method steps recited, but to the structure implied by the steps. In the present case, the structure implied by the recitation of "a layer formed by electrolytic polymerization" is a layer of polymer. Each of the prior art references anticipates this structure. Sarker et al. also teach electropolymerization of poly-1.

8. Claim 21 is rejected under 35 U.S.C. 102(b) as being anticipated by Tan et al. (US 6,291,621 B1).

See the whole patent. In particular, see the formulae spanning columns 3 and 4. These prior art polymers meet the limitations of a polymer as defined in present claim 21.

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9. Claim 21 is rejected under 35 U.S.C. 102(e) as being anticipated by Zhuang et al. (US 6,602,395 B1).

See the whole patent. In particular, see the formulae for Poly(BTDF) and Poly(BTDC) in column 8. Both of these prior art polymers meet the limitations of a polymer as defined in present claim 21.

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. Claims 4, 6, 8, 9 and 12-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tada et al. in *J. Phys. D: Appl. Phys.*, Vol. 30, pp. 2063-2068 (1997), or Sarker et al. in *Synthetic Metals*, Vol. 113, pp. 151-154 (2000) or Pei et al. in *Macromolecules*, Vol. 33, pp. 2462-2471 (2000) as applied to claims 1-3, 15 and 21 above, and further in view of Zhuang et al. (US 6,602,395) and Kamatani et al. (US 2003/0059646 A1).

Each of the three primary references discloses a polymer having a repeating unit of general formula (I), and discloses a light-emitting device having a layer of the polymer between a pair of electrodes.

None of the three primary references explicitly discloses a device having the structure required by any of present claims 4, 6, 8, 9 and 12-14, but the device structures specified in the claims (absent the specified polymer) are not novel.

For example, see column 1, line 14-c. 2, l. 7 and the Figures in the patent to Zhuang et al., and see paragraphs [0004]-[0005] and the Figures in the published application of Kamatani et al. It would have been *prima facie* obvious to one of ordinary skill in the art at the time of the invention to utilize the polymer(s) disclosed by Tada et al., Sarker et al., or Pei et al. to make electroluminescent display devices of known structures such as those described in the prior art of Zhuang et al. and Kamatani et al.

12. Claims 1-12 and 15-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zhuang et al. (US 6,602,395 B1) in view of Tada et al. in *J. Phys. D: Appl. Phys.*, Vol. 30, pp. 2063-2068 (1997), or Sarker et al. in *Synthetic Metals*, Vol. 113, pp. 151-154 (2000) or Pei et al. in *Macromolecules*, Vol. 33, pp. 2462-2471 (2000).

See the entire patent to Zhuang et al. In particular, see column 1, line 8-c. 2, l. 43, c. 3, l. 35-65, c. 8, l. 33-c. 10, l. 22 and the Figures.

Zhuang et al. disclose light-emitting displays made by electrolytic polymerization. Zhuang et al. teach that copolymers comprising thiophene units and aromatic units may be used as the light-emitters, and that multi-colored displays may be made by using different polymers having different light-emitting characteristics. Zhuang et al. also teach that it was known in the

art at the time of the invention that multi-colored displays could be provided by methods other than electrolytic polymerization.

Zhuang et al. do not disclose a specific example of a polymer meeting the limitations of the polymer required by present independent claims 1, 2, 4, 6, 9 and 11, and claims dependent therefrom, but the required polymer is within the scope of polymers provided by polymerization of monomers of the third formula shown in column 9.

Each of the prior art references to Tada et al., Sarker et al. and Pei et al. disclose polymers made from monomers of the third formula shown in column 9 of the Zhuang patent, and teach the use of the polymers as light-emitters in light-emitting devices having a pair of electrodes sandwiching the light-emitter.

In the article by Tada et al., for example, see Figure 1 on page 2064, and see the full paragraph in the second column on p. 2064. In the article by Sarker et al., for example, see poly-1, poly-2, poly-3 and poly-4 in Fig 2 on page 152, see the two full paragraphs in the first column on p. 152, and see Fig. 3 on p. 152. In the article by Pei et al., for example, see 3a-f in Scheme 1 on page 2465 and see the section titled "Light-Emitting Diodes from the Polymers", which begins on p. 2469.

It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize polymers such as taught by Tada et al., Sarker et al., or Pei et al., to provide light-emitting displays such as described by Zhuang et al. It would have been within the level of ordinary skill of a worker in the art at the time of the invention to select suitable polymers from known polymers to make a multi-colored light-emitting display by prior art methods such as

described in column 2 of the Zhuang patent. It also would have been within the level of ordinary skill of a worker in the art at the time of the invention to select suitable polymers from known polymers and derivatives thereof to make a multi-colored light-emitting display by Zhuang's electrolytic polymerization. Guided by Zhuang's teachings, it would have been a matter of routine experimentation to determine suitable monomers capable of being electrolytically polymerized to make a display according to Zhuang's method.

13. Claims 13, 14, 19 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zhuang et al. (US 6,602,395 B1) in view of Tada et al. in *J. Phys. D: Appl. Phys.*, Vol. 30, pp. 2063-2068 (1997), or Sarker et al. in *Synthetic Metals*, Vol. 113, pp. 151-154 (2000) or Pei et al. in *Macromolecules*, Vol. 33, pp. 2462-2471 (2000), as applied to claims 1-12 and 15-18 above, and further in view of Kamatani et al. (US 2003/0059646 A1).

Zhuang et al. provide pixellated light-emitting displays. The paragraph bridging columns 1 and 2 of the Zhuang patent indicates that there are conventional matrix-addressing schemes, but Zhuang et al. do not specifically describe the additional features required by present claims 13, 14, 19 and 20.

Data signal lines, scan signal lines, and nonlinear elements such as thin film transistors, are not novel components of pixellated light-emitting displays. For example, see the Figures in the published application of Kamatani et al.

It would have been *prima facie* obvious to one of ordinary skill in the art at the time of the invention to provide pixellated light-emitting displays as taught by Zhuang et al., and to

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include components known in the art of pixellated light-emitting displays, such as the electrical components disclosed for the pixellated light-emitting displays described by Kamatani et al.

14. Miscellaneous:

The examiner suggests inserting --the-- after “wherein” in the eighth line of claim 9.

In the seventh line from the end of claim 9, “and” should be deleted from the phrase “(a-1) and are”.

Claim 15 recites “[t]he light-emitting device according to claim 2” while claim 2 recites “[a]n electroluminescent device”. While an electroluminescent device is a light-emitting device, the examiner suggests that the preamble of either claim 2 or claim 15 be amended to provide consistency in claim terminology.

In the fourth line of claim 21, “an” should read --a--.

15. The International Search Report that is listed in the “Other Prior Art” section of the Substitute Form 1449A/PTO received July 27, 2004 is not present in the IFW, so the examiner has not considered the ISR. The examiner does not know whether the report was received, but not scanned, or not received. If applicant wants the ISR to be considered, applicant is respectfully requested to include a copy of the ISR as an attachment to the response to this action.

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16. Any inquiry concerning this communication should be directed to Marie R. Yamnitzky at telephone number (571) 272-1531. The examiner works a flexible schedule but can generally be reached at this number from 6:30 a.m. to 4:00 p.m. Monday, Tuesday, Thursday and Friday, and every other Wednesday from 6:30 a.m. to 3:00 p.m.

The current fax number for all official faxes is (571) 273-8300. (Unofficial faxes to be sent directly to examiner Yamnitzky can be sent to (571) 273-1531.)

MRY
October 16, 2005



MARIE YAMNITZKY
PRIMARY EXAMINER

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